



MU123

Practice quizzes for Units 5 to 7 (Set 2)

Note that the questions in this document are designed for on screen usage via the course website. Some of the instructions within questions may not quite suit this printed version, e.g. when the question refers to 'box below' this should be interpreted as 'box in margin'.

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Unit 5 practice quiz questions

Question 1

Evaluate the following expression when $a = 5$ and $b = -4$.

$$4a - 3(b + 4)$$

Enter your answer as a number in the box below.

Answer:

Question 2

Choose the options that are the coefficients of terms of the expression

$$2x^2 - 5x + x^2 - 3 - 9x$$

when all of the like terms are collected.

Coefficient of x^2

Coefficient of x

Constant term

Options

- A** -4 **B** 1 **C** 14 **D** 3
E -14 **F** 4 **G** -3 **H** -1

Question 3

Collect like terms and then select the option that is equivalent to the following expression.

$$m + (-7n) - (-3m) - 7n$$

Options

- A** $-2m - 14n$ **B** $-2m$ **C** $4m$
D $4m - 14n$ **E** $m - 21mn - 7n$

Answer:

Question 4

Multiply out the brackets in the expression

$$a^2(b + a)$$

and choose the option below that is equivalent to it.

Options

- A** $b - 1$ **B** $a^2b + a^3$ **C** $a^2b + 1$ **D** $-a^2b + a^3$
E $a^2b + a$ **F** $a^2b - a^3$ **G** $b + 1$

Answer:

Question 5

Choose the numbers from the drop-down list that give the correct coefficients when the brackets in the expression

$$2x(2x + 2y) - 4y(-x - 3y)$$

are multiplied out and all like terms are collected.

Coefficient of x^2

Coefficient of xy

Coefficient of y^2

Options

- | | | | | | | |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| A 5 | B 9 | C -2 | D 4 | E 6 | F 1 | G -6 |
| H -3 | I 7 | J -1 | K 8 | L 2 | M -8 | N -9 |
| O 3 | P -4 | Q -7 | R 12 | S -5 | | |

Question 6

Remove the brackets and select the option that is equivalent to the following expression.

$$4u + 2u(3 - v)$$

Options

- | | | |
|----------------------|----------------------|----------------------|
| A $10u + 2uv$ | B $10u - 2uv$ | C $-2u + 2uv$ |
| D $-2u + 2v$ | E $10u + 2v$ | F $10u - 2v$ |

Answer:

Question 7

Choose two expressions that are equivalent to the following expression.

$$-3mn^2 + m(2m - 2n^2)$$

Options

- | | | |
|--------------------------|--------------------------|-------------------------|
| A $-m(n^2 - 2m)$ | B $-m(5n^2 - 2m)$ | C $-m(n^2 + 2m)$ |
| D $-5mn^2 + 2m^2$ | E $-mn^2 - 2m^2$ | F $-mn^2 + 2m^2$ |

Answer:

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Practice quizzes for Units 5 to 7 (Set 2)

Question 8

The following are the first few steps of a number trick.

Think of a number.

Multiply it by 3.

Subtract 1.

Double the result.

Suppose that the starting number is n .

Choose the expression that represents the number obtained by following these steps.

Options

A $3n + 4$ **B** $6n - 1$ **C** $6n - 2$ **D** $6n + 4$

E $3n - 2$ **F** $3n - 1$

Answer:

Question 9

Solve the equation

$$11a - 12 = 4a + 2,$$

giving your answer as a number, rounded to two decimal places if necessary.

Answer:

Question 10

Solve the equation

$$7(y - 2) = 5 - 6(y - 5),$$

giving your answer as a number, rounded to two decimal places if necessary.

Answer:

Question 11

Solve the equation

$$3z - 6 = \frac{2z}{9} - 2,$$

giving your answer to two decimal places.

Answer:

Question 12

Solve the equation

$$-4b + 4 = \frac{4b + 5}{7},$$

giving your answer as a number, rounded to two decimal places if necessary.

Answer:

Question 13

Solve the equation

$$\frac{4b}{7} - 3 = \frac{2b - 9}{7},$$

giving your answer as a number, rounded to two decimal places if necessary.

Answer:

Question 14

The price of a second-hand car has been reduced by 15% and is now £5610. What was the price before the reduction, in pounds?

Enter your answer in the box below as a decimal to the nearest penny (without the £ sign).

Answer:

Question 15

In twelve years' time, Erin will be six times the age she was six years ago. Choose the equation that is satisfied by x , where x represents Erin's age in years.

Options

A $x + 12 = 6x - 6$

B $x - 6 = 6(x + 12)$

C $x - 6 = 6x + 12$

D $x - 12 = 6(x + 6)$

E $x + 6 = 6(x - 12)$

F $x + 12 = 6(x - 6)$

Answer:

Question 16

A number x is such that dividing the number by 6 and then adding 4 gives the same outcome as adding 37 and then dividing by 7.

Write down and solve an equation satisfied by x .

Enter your answer in the box below as a number, rounded to two decimal places if necessary.

Answer:

Unit 6 practice quiz questions

Question 1

Which one of the following points lies on the line $y = 4x + 6$?

Options

A $(-3/4, 3)$ B $(1/2, 4)$ C $(-2, -14)$ D $(6, 24)$

Answer:

Question 2

What is the gradient of the line joining the points $(2.1, 3.5)$ and $(0, -2.3)$.

Give your answer as a number correct to 2 significant figures.

Answer:

Question 3

The equation of a straight line is $y = 5.3x + 3.4$.

What is the x -intercept of this line?.....

What is the y -intercept of this line?.....

What is the gradient of this line?

Options

A -5.3 B 0.642 C -1.559 D 3.4
 E 5.3 F -0.642 G -3.4 H 1.559

Question 4

What does the graph of $y = -6x + 5$ look like?

Select one answer.

Options

- A The line is parallel to the y -axis and passes through the point $(5, 0)$.
 B It passes through the point $(0, 5)$ and for every 6 units moved across to the right, it falls by 1 unit.
 C It passes through the point $(0, 5)$ and for every unit moved across to the right, it falls by 6 units.
 D It passes through the point $(5, 0)$ and for every unit moved across to the right, it falls by 6 units.
 E It passes through the point $(0, 5)$ and for every unit moved across to the right, it rises by 6 units.
 F The line is parallel to the x -axis and passes through the point $(0, 5)$.

Answer:

Question 5

Which **two** of the following lines have an x -intercept of 6?

Options

- A** $y = 6x + 36$ **B** $x = 6$ **C** $y = 6x$
D $y = x + 6$ **E** $y = -0.5x + 3$ **F** $y = 6$

Answer:

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Question 6

A line joins the points (5, 3) and (2, 6).

The gradient of the line is:

The y -intercept is:

Options

- A** 5 **B** 6 **C** -1 **D** 1 **E** 8
F 3 **G** -4 **H** 0.25 **I** 2

Question 7

A line has gradient 0.5 and passes through the point (4, 5.5).

What is the y -intercept of this line?

(Your answer should be a number.)

Answer:

Question 8

A line is parallel to $y = 6x - 5$ and has a y -intercept of -2.

Select the one option that gives the equation of the line.

Options

- A** $y = 6x + 2$ **B** $y = 2x + 5$ **C** $y = -6x + 2$
D $y = 2x - 5$ **E** $y = -2x - 5$ **F** $y = 6x - 2$

Answer:

Question 9

Choose the equation of the following horizontal and vertical lines from the drop down box.

A line that is parallel to the x -axis and goes through (4, 3)

A line that is parallel to the y -axis and goes through (4, 3)

Options

- A** $x = 3$ **B** $y = 3$ **C** $x = 4$ **D** $y = 3x + 4$
E $y = 4$ **F** $y = 0.75x$ **G** $y = 4x + 3$ **H** $y = 4x$

Unit 7 practice quiz questions

Question 1

Select the option that is the equation

$$Q = 3 - \frac{T}{7}$$

rearranged to make T the subject of the equation.

Options

- A** $T = -Q + 3$ **B** $T = -7Q + 21$ **C** $T = -Q + 21$
D $T = Q + 3$ **E** $T = Q + 21$ **F** $T = 7Q + 21$
G $T = -7Q + 3$ **H** $T = 7Q + 3$

Answer:

Question 2

Find the gradient of the straight line with equation $3x + 4y = 2$.

Give your answer as a fraction (e.g. if your answer is $-\frac{5}{2}$ then enter $-5/2$ in the box below).

Answer:

Question 3

Factorise the expression

$$12s^2 - 6s^3,$$

taking out the highest common factor.

Choose the expression that remains in brackets when this is done.

Options

- A** $2s^2 - s$ **B** $12 - 6s$ **C** $2s^2 - s^3$ **D** $2 - s^3$
E $2 - 6s$ **F** $12 - s$ **G** $2 - s$

Answer:

Question 4

Factorise the expression

$$12A^2B^2 + 2A^2B^3 - 4A^3B^2,$$

taking out the highest common factor.

Choose the expression that remains in brackets when this is done.

Options

- A** $6 + B - 2A^3$ **B** $6A^2 + B - 2A$ **C** $6A^2 + A^2B - 2A^3$
D $6B^2 + B - 2A$ **E** $6 + A^2B - 2A$ **F** $6 + B - 2A$
G $6 + B^3 - 2A$ **H** $6B^2 + B^3 - 2AB^2$

Answer:

Question 5

Select the option that is the equation

$$X - 5Y = 2XY$$

rearranged to make X the subject of the equation.

Options

A $X = \frac{5Y}{2Y - 1}$

B $X = 5Y$

C $X = \frac{5Y}{-2Y + 1}$

D $X = \frac{5Y}{-2Y - 1}$

E $X = \frac{5Y}{2Y + 1}$

Answer:

Question 6

Solve the following pair of simultaneous linear equations.

$$-x + y = -8$$

$$-x + 2y = -11$$

Select the option that corresponds to the solution.

Options

A $x = -3, y = 5$

B $x = 9, y = -1$

C $x = -1, y = 9$

D $x = 9, y = 1$

E $x = 5, y = -3$

Answer:

Question 7

Let c and f denote a temperature in degrees Celsius and degrees Fahrenheit respectively. Then the following formula holds

$$f = 1.8c + 32$$

What temperature is the number of degrees Celsius, c , equal to eight less than the number of degrees Fahrenheit, f ?

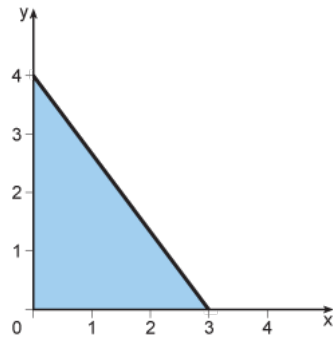
(Hint: Use the previous sentence to write down a second equation relating c and f . Solve the pair of simultaneous linear equations to find c .)

In the box below, enter the number of degrees Celsius, c , to the nearest integer (without units).

Answer:

Question 8

Consider the shaded region shown in the following figure.



Select the inequalities that correspond to the shaded area.

Options

A $x \geq 0,$
 $y \geq 0,$
 $12 \leq 3x + 4y$

B $x \geq 0,$
 $y \geq 0,$
 $4x + 3y \leq 12$

C $x \geq 0,$
 $y \geq 0,$
 $12 \leq 4x + 3y$

D $x \geq 0,$
 $y \geq 0,$
 $x + y \leq 1$

E $x \geq 0,$
 $y \geq 0,$
 $3x + 4y \leq 12$

Answer:

Unit 5 practice quiz solutions

Solution 1

Correct answer : 20

If $a = 5$ and $b = -4$, then

$$\begin{aligned} 4a - 3(b + 4) &= 4 \times 5 - 3 \times (0) \\ &= 20 + 0 \\ &= 20 \end{aligned}$$

So the answer is 20.

See Unit 5, Subsection 2.1.

Solution 2

Matching pairs:

Coefficient of x^2	3
Coefficient of x	-14
Constant term	-3

To simplify the given expression, first group the like terms and then collect them:

$$\begin{aligned} 2x^2 - 5x + x^2 - 3 - 9x &= (2x^2 + x^2) + (-5x - 9x) + (-3) \\ &= 3x^2 - 14x - 3. \end{aligned}$$

So the answer is that the coefficient of x^2 is 3, the coefficient of x is -14 and the constant term is -3.

See Unit 5, Subsection 2.3.

Solution 3

Correct option : D

There are 4 terms, namely:

$$m, \quad +(-7n), \quad -(-3m), \quad -7n.$$

First consider the terms that involve m and simplify:

$$m - (-3m) = m + 3m = 4m.$$

Now consider the terms that involve n and simplify:

$$(-7n) - 7n = -7n - 7n = -14n.$$

So the given expression simplifies to $4m - 14n$ and this is the required answer.

See Unit 5, Subsection 3.2.

Solution 4

Correct option : B

$$a^2(b + a) = a^2b + a^3$$

This is obtained by multiplying each of the two terms inside the brackets, b and a , by the multiplier, a^2 :

$$a^2 \times b = a^2b$$

$$a^2 \times (+a) = +a^3$$

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See Unit 5, Subsection 4.1.

Solution 5

Matching pairs:

Coefficient of x^2	4
Coefficient of xy	8
Coefficient of y^2	12

Multiplying out the brackets and then collecting like terms gives

$$\begin{aligned}2x(2x + 2y) - 4y(-x - 3y) &= 4x^2 + 4xy + 4xy + 12y^2 \\ &= 4x^2 + 8xy + 12y^2\end{aligned}$$

Hence the coefficient of x^2 is 4, the coefficient of xy is 8, and the coefficient of y^2 is 12.

See Unit 5, Subsection 4.1.

Solution 6

Correct option :

Multiplying out the bracket leads to

$$\begin{aligned}4u + 2u(3 - v) &= 4u + 6u - 2uv, \\ &= 10u - 2uv.\end{aligned}$$

So the answer is $10u - 2uv$.

See Unit 5, Subsection 4.1.

Solution 7

Correct option :

Correct option :

Multiplying out the bracket and then collecting like terms gives

$$\begin{aligned}-3mn^2 + m(2m - 2n^2) &= -3mn^2 + 2m^2 - 2mn^2 \\ &= -5mn^2 + 2m^2.\end{aligned}$$

To find the other equivalent expression expand the brackets of the other options and compare them with the above simplified expression. The bracketed expression that expands to the above expression is $-m(5n^2 - 2m)$.

So the two expressions equivalent to $-3mn^2 + m(2m - 2n^2)$ are $-5mn^2 + 2m^2$ and $-m(5n^2 - 2m)$.

See Unit 5, Subsection 4.1.

Solution 8

Correct option :

If the starting number is n , then multiplying it by 3 leads to $3n$.

Subtracting 1 gives $3n - 1$, and doubling this gives

$$2(3n - 1) = 6n - 2.$$

See Unit 5, Subsection 4.3.

Solution 9Correct answer : 2

Starting from the equation

$$11a - 12 = 4a + 2.$$

First subtract $4a$ from both sides to get

$$7a - 12 = 2.$$

Now add 12 to both sides to yield

$$7a = 14.$$

Division of both sides by 7 gives $a = 2$.So the solution is $a = 2$.

See Unit 5, Subsection 5.2.

Solution 10Correct answer : 3.77

Starting from the equation

$$7(y - 2) = 5 - 6(y - 5).$$

Multiplying out the brackets on both sides of the equation, and then combining the constant terms on the right-hand side, gives

$$7y - 14 = 35 - 6y.$$

First add $6y$ to both sides to get

$$13y - 14 = 35.$$

Now add 14 to both sides to yield

$$13y = 49.$$

Division of both sides by 13 gives $y = \frac{49}{13}$.Converting this to a (decimal) number and rounding to two decimal places, the solution is $y = 3.77$.

See Unit 5, Subsection 5.3.

Solution 11Correct answer : 1.44

Starting from the equation

$$3z - 6 = \frac{2z}{9} - 2.$$

First clear the fraction on the right-hand side of the given equation, by multiplying both sides of the equation by 9; this leads to

$$27z - 54 = 2z - 18.$$

Now subtract $2z$ from both sides to get

$$25z - 54 = -18.$$

Now add 54 to both sides to yield

$$25z = 36.$$

Division of both sides by 25 gives $z = \frac{36}{25}$.To two decimal places, this solution is $z = 1.44$.

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See Unit 5, Subsection 5.3.

Solution 12

Correct answer : 0.72

Starting from the equation

$$-4b + 4 = \frac{4b + 5}{7}.$$

First clear the fraction on the right-hand side of the given equation, by multiplying both sides of the equation by 7; this leads to

$$-28b + 28 = 4b + 5.$$

Now subtract $4b$ from both sides to get

$$-32b + 28 = 5.$$

Now add 28 to both sides to yield

$$-32b = -23.$$

Division of both sides by -32 gives $b = \frac{23}{32}$.

Converting this to a (decimal) number and rounding to two decimal places, the solution is $b = 0.72$.

See Unit 5, Subsection 5.3.

Solution 13

Correct answer : 6

Starting from the equation

$$\frac{4b}{7} - 3 = \frac{2b - 9}{7}.$$

First clear the fractions by multiplying both sides of the equation by the lowest common multiple of 7 and 7, i.e. multiply by 7:

$$4b - 21 = 2b - 9.$$

Now subtract $2b$ from both sides to get

$$2b - 21 = -9.$$

Now add 21 to both sides to yield

$$2b = 12.$$

Division of both sides by 2 gives $b = 6$.

So the solution is $b = 6$.

See Unit 5, Subsection 5.3.

Solution 14

Correct answer : 6600.00

Suppose that $\pounds x$ was the price of the second-hand car before the reduction. The price was reduced by $15\% = 0.15$, and so the reduced price is obtained by multiplying the original price by $1 - 0.15 = 0.85$; that is,

$$0.85x = 5610.$$

Dividing both sides of this equation by 0.85 gives $x = 6600.00$, so the price of the second-hand car before the reduction was $\pounds 6600.00$.

See Unit 5, Subsection 5.4.

Solution 15

Correct option : ☐ F

Let Erin's age be x years. Then in twelve years' time, she will be aged $x + 12$.

Also, six years ago Erin's age was $x - 6$, and six times that age is $6(x - 6)$.

So the 'word equation' given in the question is equivalent to the following equation

$$x + 12 = 6(x - 6).$$

See Unit 5, Subsection 5.4.

Solution 16

Correct answer : ☐ 54

The expression corresponding to dividing x by 6 and adding 4 is

$$\frac{x}{6} + 4.$$

The expression corresponding to adding 37 to x and dividing by 7 is

$$\frac{x + 37}{7}.$$

Hence the equation satisfied by x is

$$\frac{x}{6} + 4 = \frac{x + 37}{7}.$$

To solve this equation we start by clearing the fractions. Multiplying both sides by the lowest common multiple of 6 and 7, which is 42, leads to

$$7x + 168 = 6x + 222.$$

Now subtract $6x$ from both sides to get

$$x + 168 = 222.$$

Subtract 168 from both sides, to obtain

$$x = 54.$$

Dividing both sides by 1 gives the answer that x equals 54.

See Unit 5, Subsection 5.4.

Unit 6 practice quiz solutions

Solution 1

Correct option : A

A point lies on a line if its coordinates satisfy the equation.

To check if a point lies on a line, substitute its x -coordinate into the equation of the line. If the resulting value for y is the same as the y -coordinate, the point lies on the line. If it is different, the point does not lie on the line.

In this case, the point which lies on the line is $(-3/4, 3)$ since, substituting $-3/4$ for x in the equation of the line gives

$$\begin{aligned} y &= 4 \times (-3/4) + 6 \\ &= -3 + 6 \\ &= 3 \end{aligned}$$

which is the same as the y -coordinate of the point.

See Unit 6, Subsection 1.2.

Solution 2

Correct answer : 2.8

The gradient of the line joining the points (x_1, y_1) and (x_2, y_2) is $\frac{y_2 - y_1}{x_2 - x_1}$.

So the gradient of the line joining the points $(2.1, 3.5)$ and $(0, -2.3)$ is $\frac{-2.3 - 3.5}{0 - 2.1} = \frac{-5.8}{-2.1}$ or 2.8 (to 2 s.f.).

See Unit 6, Subsections 2.1 and 2.2.

Solution 3

Matching pairs:

What is the x -intercept of this line?	-0.642
What is the y -intercept of this line?	3.4
What is the gradient of this line?	5.3

The equation of a straight line is of the form $y = mx + c$

where m is the gradient of the line and c the y -intercept.

So, the coefficient of x gives the gradient and the constant term is the value of the y -intercept.

In this case, the gradient is 5.3 and the y -intercept is 3.4.

The x -intercept can be found by putting $y = 0$ into the equation.

$$\begin{array}{ll} \text{So} & 0 = 5.3x + 3.4 \\ \text{Subtracting 3.4 from both sides gives} & -3.4 = 5.3x \\ \text{Dividing both sides by 5.3 gives} & -0.642 = x \end{array}$$

Hence the x -intercept is -0.642 (to 3 d.p.).

See Unit 6, Subsection 3.3.

Solution 4

Correct option : C

The correct description is "It passes through the point $(0, 5)$ and for every unit moved across to the right, it falls by 6 units."

The gradient of $y = -6x + 5$ is the coefficient of x , that is -6 .

So, for every unit moved across to the right, the line falls by 6 units.

The y -intercept is 5, so the line passes through the point $(0, 5)$.

See Unit 6, Subsection 3.3.

Solution 5

Correct option : B

Correct option : E

The two lines with an x -intercept of 6 are:

- $x = 6$

This is a vertical line that passes through the point $(6, 0)$, so its x -intercept is 6.

- $y = -0.5x + 3$

The x -intercept can be found by solving the equation $y = 0$.

For this option, when $y = 0$, $-0.5x + 3 = 0$.

Subtracting 3 from both sides gives: $-0.5x = -3$

Multiplying both sides by -2 gives: $x = 6$.

So this equation does indeed have an x -intercept of 6.

See Unit 6, Subsection 3.3.

Solution 6

Matching pairs:

The gradient of the line is:	-1
The y -intercept is:	8

The equation of a straight line is given by $y = mx + c$

where m is the gradient of the line and c the y -intercept.

The gradient of the line joining $(5, 3)$ and $(2, 6)$ is $\frac{6-3}{2-5} = \frac{3}{-3} = -1$

So the equation of the line is $y = -1x + c$.

The point $(5, 3)$ lies on the line.

So $3 = -1 \times 5 + c$
and $c = 8$

Hence the y -intercept is 8.

See Unit 6, Subsection 3.5.

Solution 7

Correct answer : 3.5

The equation of a line with gradient 0.5 is $y = 0.5x + c$.

The line passes through $(4, 5.5)$.

So $5.5 = 0.5 \times 4 + c$
and $5.5 = 2 + c$
so $5.5 - 2 = c$
hence $c = 3.5$

Thus the y -intercept is 3.5.

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See Unit 6, Subsections 3.5

Solution 8

Correct option : ☐ F

The gradient of the line $y = 6x - 5$ is the coefficient of x , that is 6.

Parallel lines have the same gradient, so the gradient of the new line is also 6.

Hence the equation of the new line is $y = 6x + c$, where c is the y -intercept.

The y -intercept required is -2 .

So, the equation of the new line is $y = 6x - 2$.

See Unit 6, Subsection 3.5.

Solution 9

Matching pairs:

A line that is parallel to the x -axis and goes through $(4, 3)$	$y = 3$
A line that is parallel to the y -axis and goes through $(4, 3)$	$x = 4$

- A line parallel to the x -axis has the form $y = a$ where a is a constant. Since the point $(4, 3)$ satisfies the line, $a = 3$ and the equation of the line is $y = 3$.
- A line parallel to the y -axis has the form $x = b$ where b is a constant. Since the point $(4, 3)$ satisfies the line, $b = 4$ and the equation of the line is $x = 4$.

See Unit 6, Subsection 3.5.

Unit 7 practice quiz solutions

Solution 1

Correct option : B

Starting from the equation

$$Q = 3 - \frac{T}{7}$$

subtract 3 from both sides gives

$$Q - 3 = -\frac{T}{7}$$

Multiplying through by -7 gives the equation with T as the subject of the equation.

$$-7Q + 21 = T$$

See Unit 7, Subsection 1.1.

Solution 2

Start by rearranging the equation into the form $y = mx + c$ as follows:

$$3x + 4y = 2$$

Subtracting $3x$ from both sides gives

$$4y = -3x + 2$$

Dividing by 4 yields

$$y = -\frac{3x}{4} + \frac{2}{4}$$

Comparing with $y = mx + c$ gives the gradient m as $-3/4$.

See Unit 7, Subsection 1.2.

Solution 3

Correct option : G

First consider the numerical coefficients, this gives a common factor of 6. Looking at the variables gives a common factor of s^2 . So the highest common factor of the expression is $6s^2$. The expression factorises as

$$12s^2 - 6s^3 = 6s^2(2 - s)$$

See Unit 7, Subsection 2.2.

Solution 4

Correct option : F

First look at the numerical coefficients, these have a common factor of 2.

Now look at the powers of A , to get a common factor of A^2 .

Finally look at the powers of B to get a common factor of B^2 .

Multiplying these together gives the highest common factor of the expression as $2A^2B^2$.

So the expression factorises as

$$12A^2B^2 + 2A^2B^3 - 4A^3B^2 = 2A^2B^2(6 + B - 2A),$$

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and the required answer is $6 + B - 2A$.

See Unit 7, Subsection 2.2.

Solution 5

Correct option :

Starting from the equation

$$X - 5Y = 2XY$$

First add $5Y$ to both sides in order to move all the terms not involving X to the right hand side:

$$X = 2XY + 5Y$$

Now subtract $2XY$ from both sides in order to move all terms involving X to the left hand side:

$$X - 2XY = 5Y$$

Now factorise the equation to get

$$X(-2Y + 1) = 5Y$$

Dividing both sides by $-2Y + 1$ leaves X as the subject of the equation.

$$X = \frac{5Y}{-2Y + 1}$$

See Unit 7, Subsection 2.3.

Solution 6

Correct option :

Start with the pair of simultaneous equations

$$\begin{aligned} -x + y &= -8 \\ -x + 2y &= -11 \end{aligned}$$

The strategy we are going to use is to use the elimination method, and we are going to eliminate the variable x .

In this case the coefficients of x are the same so no multiplication is needed in the first step of the strategy. So we have

$$\begin{aligned} -x + y &= -8 \\ -x + 2y &= -11 \end{aligned}$$

Subtracting the second equation from the first gives

$$-y = 3$$

Dividing both sides by -1 gives $y = -3$. Substituting this value back into the first equation gives

$$-x - 3 = -8$$

This simplifies to $x = 5$.

So the solution to the simultaneous equations is $x = 5$, $y = -3$.

See Unit 7, Subsection 3.3.

Solution 7

Correct answer :

The temperature when the eight less than is when $c = f - 8$.

So there are two equations that need to be solved simultaneously:

$$\begin{aligned}f &= 1.8c + 32 \\c &= f - 8\end{aligned}$$

Since the second equation has only c on the left hand side we can use this to substitute for c in the first equation.

$$f = 1.8 \times (f - 8) + 32$$

Subtracting $1.8f$ from both sides and simplifying gives

$$f - 1.8f = 17.6$$

This simplifies to

$$-0.8f = 17.6$$

So the solution for the Fahrenheit equation is $f = -22$.

Substituting this into $c = f - 8$ and simplifying gives the answer $c = -30$.

See Unit 7, Subsection 3.4.

Solution 8

Correct option : B

First work out the equation of the sloping line. The points (3,0) and (0,4) are on the sloping line. Now follow the procedure to find the equation of a line through two given points (given in Section 3.5 of Unit 6) to find the equation of the sloping line as:

$$4x + 3y = 12$$

To decide which inequality represents the region underneath the line take any point in the region below the line and see whether the left hand side of the equation is less than or greater than 12. A convenient point to choose is the origin, since the left hand side is zero when $x = 0$ and $y = 0$ is substituted and $0 \leq 12$ the correct inequality is:

$$4x + 3y \leq 12$$

The other inequalities defining the region are that both x and y are positive, so the region corresponds to the following inequalities.

$$\begin{aligned}x &\geq 0, \\y &\geq 0, \\4x + 3y &\leq 12\end{aligned}$$

See Unit 7, Subsection 4.3.